Space Junk

Earth's Atmosphere

2009

The Defense Advanced Research Projects Agency (known as DARPA) issued a request for ideas on how to clean up orbital debris, commonly known as space junk, last week. The term space junk refers to all the objects currently in orbit around earth that no longer serve a useful purpose.

Why would DARPA want to put effort into removing space junk? Why is it a problem?

A root cause analysis of this issue can be performed. The first step is to identify the problem. Then the investigation can be documented as a Cause Map and the causes contributing to the space junk problem should be investigated. In this case, the problem is that space junk poses a threat to unmanned and manned spacecraft, including satellites.

Space junk comes from a variety of sources (which will be discussed later) and is a wide variety of sizes. Impacts with large debris (greater than 1 kilogram) can destroy spacecraft at orbital velocities. The only protection currently available is to move the spacecraft out of the path of space junk. Impacts with tiny debris cause erosion damage and can substantially shorten the life span of spacecraft. Solar panels and windows are especially vulnerable to this type of damage.

Destroyed spacecraft then become part of the problem as long as they remain in orbit as defunct space junk themselves.

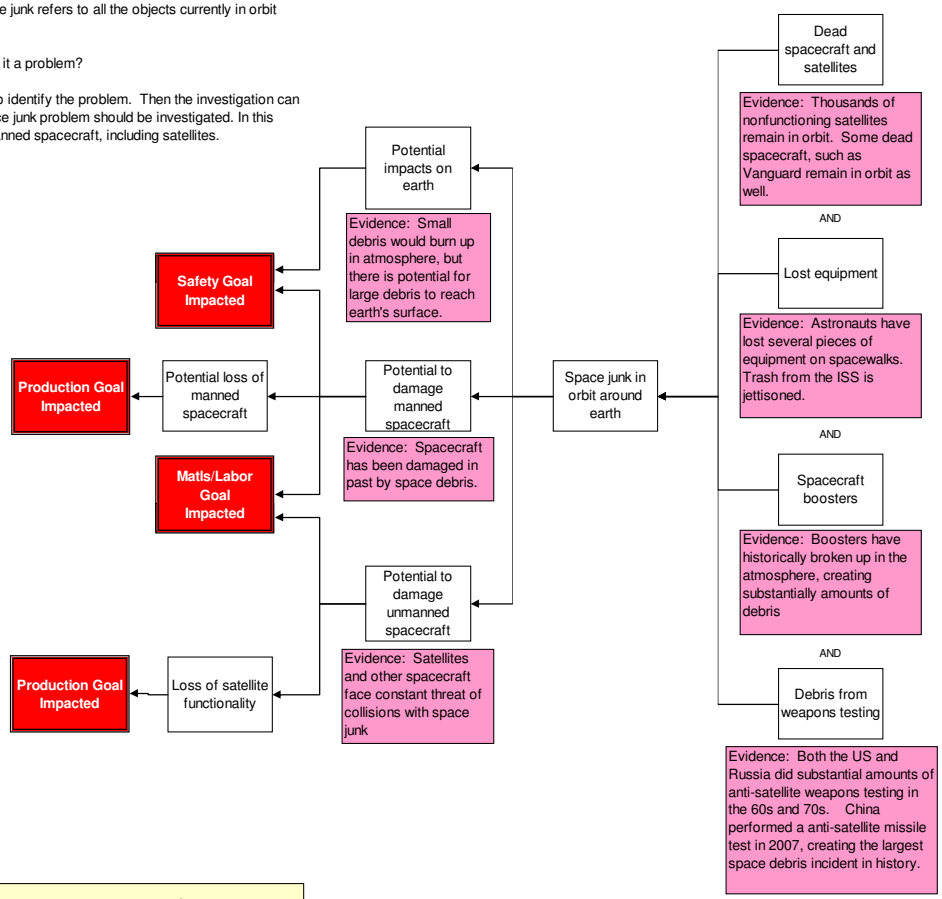
In addition to nonfunctioning, dead spacecraft, some of the causes of space junk are boosters from past spacecraft launches, lost equipment, and debris from weapons testing. These causes should all be added to the cause map.

The problems associated space junk continue to increase and with more and more debris is created in earth's orbit.

The largest space debris incident in history occurred in 2007 after China performed an anti satellite missile test and intentionally blew up a defunct satellite. This test also targeted a satellite in the most heavily populated area of earth's orbit.

Currently, the Space Surveillance Network tracks more than 20,000 objects in orbit. And this number only includes those large enough to track. There are estimated to be thousands of objects too small to track currently in orbit.

Hopefully DARPA is able to find an effective solution to mitigate the problem and reduce the risk posed by space junk.



Cause Map

Detail Level

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Why?

Effect ← Cause

NOTE: Read the Cause Map from left to right with the phrase "Was Caused By" in place of